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# Understanding the Digital Divide

OECD

# UNDERSTANDING THE DIGITAL DIVIDE

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OECD

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

# UNDERSTANDING THE DIGITAL DIVIDE

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# UNDERSTANDING THE DIGITAL DIVIDE

"Visions of a global knowledge-based economy and universal electronic commerce, characterised by the 'death of distance' must be tempered by the reality that half the world's population has never made a telephone call, much less accessed the Internet."
*OECD (1999), The Economic and Social Impact of Electronic Commerce: Preliminary Findings and Research Agenda.*

## What is the digital divide?

As used here, the term "digital divide" refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities. The digital divide reflects various differences among and within countries. The ability of individuals and businesses to take advantage of the Internet varies significantly across the OECD area as well as between OECD and non-member countries. Access to basic telecommunications infrastructures is fundamental to any consideration of the issue, as it precedes and is more widely available than access to and use of the Internet.

The so-called "digital divide" raises a number of questions. Where does it occur and why? What are its causes? How is it to be measured? What are the relevant parameters? What is its extent, that is, how wide is the digital divide? Where is it most critical? What are its effects likely to be in the short term? In the longer term? What needs to be done to alleviate it? These questions have only recently been raised, and it is not possible, as yet, to answer all of them with any certainty.

## Measuring the digital divide

Because of the current interest in these issues, both among governments and the public, the OECD has begun efforts to measure the digital divide. In addition to communications infrastructures, important indicators appear to be computer availability – and potentially the availability of alternative access through TVs or mobile phones – and Internet access (these are "readiness" indicators). The digital divide among households appears to depend primarily on two variables, income and education. Other variables, such as household size and type, age, gender, racial and linguistic backgrounds and location also play an important role. The differences in PC and Internet access by household income are very large and increasing, but access in lower income groups is rising. Largely through its effects on income, the higher the level of education, the more likely individuals are to have access to ICTs.

Other important indicators concern differences in the profiles of countries, individuals and businesses that use, and make the most use of, the possibilities offered by the new information technologies and the Internet. As with all efforts to measure new phenomena, much of the information included here represents a first effort to obtain data on the dimensions of the digital divide. Because harmonised cross-country data collection does not exist for measuring some of the relevant phenomena, the figures are often not comparable in terms of time and coverage.

However, because access to and development of information, communication and e-commerce resources are increasingly viewed as crucial for economic and social development (for reasons of efficiency and because of network effects), OECD countries have begun to examine how best to ensure access for citizens, businesses and regions to these technologies and services. To do so efficiently and effectively, it is important that governments have information on the nature and extent of the digital divide and on the kinds of measures that can help to overcome it.

Overcoming the digital divide

The importance of policy and regulatory reform needs to be underlined. The policy rationale is the social benefits to be derived from the spillovers and positive externalities associated with diffusion and greater use of ICTs and related improvements to the skill base. Governments also recognise the economic activity that may result from electronic commerce. The liberalisation of telecommunication markets and rigorous implementation of competition in OECD countries have stimulated new investment and increased demand for communications access and services through falling prices and the offer of new innovative products. Non-OECD countries can learn valuable lessons from the liberalisation that has taken place in OECD countries and the economic and social benefits this has engendered. The evidence of the benefits of liberalisation in this area is mounting in a number of developing countries which have seen the growth in wireless networks resulting from competition.

OECD countries' policies and programmes aimed at reducing the digital divide range from general approaches aimed at strengthening and extending the infrastructure, to policies to diffuse access and information more widely and to improve the skills of individuals and workers. Particular attention is paid to policies to improve access in public institutions (libraries, local and regional government facilities, post offices, etc.) so that individuals can access ICTs at low or no cost, build familiarity and develop skills. Policies for making available low-cost and subsidised access in schools seek to build the future skills base of the workforce and to enhance diffusion. Measures have also been taken to improve access for underprivileged groups, the disabled and the elderly, and for rural, remote and low-income areas, for reasons of equity and to enhance overall economic efficiency via network effects.

Given the importance of education and its close links to income, policies to improve computer/Internet literacy and build the related skills base in educational institutions and through vocational training are seen as particularly important over the long term.

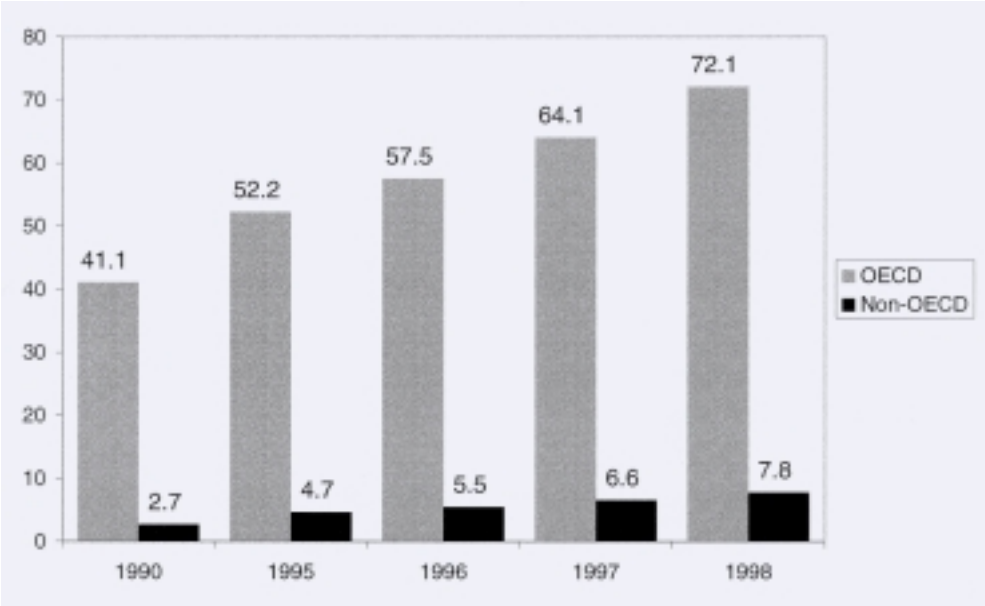
All OECD countries have support programmes for small businesses, which in general are slower to adopt new technologies and which face particular information asymmetries, management and skills issues. Support for small businesses increasingly has a component aimed at increasing the rate of uptake and use of ICTs. Governments also assist some regions and rural areas owing to particular problems associated with lagging regions.

In addition, many OECD countries have identified online delivery of services, information and transfer of government activities and procurement on line as having important demonstration effects as well as improving government efficiency. Finally, multilateral co-operation is considered important for reducing differences in international digital divides across countries and improving, by learning from others' experience, the efficiency of measures taken by other countries. Because the OECD area has been at the forefront of what has sometimes been termed the "Internet revolution", countries that have yet to reap the benefits fully can gain from such co-operation and from the example of policies which appear to be proving effective in the early adopters of computers and the Internet.

The data presented here are taken from the work of the OECD's Directorate for Science, Technology and Industry (DSTI) and are part of an ongoing OECD effort to measure the extent of the so-called "digital divide", a topic that is currently receiving a good deal of attention. It should be recognised that this effort is in an initial and developmental stage and that much of the data are not comparable across countries. Because of the preliminary and incomplete nature of the work to date, caution must be exercised when interpreting this material. References to the present publication should identify the source as OECD/DSTI. The text is published on the responsibility of the OECD Secretariat and does not reflect the consensus of Member countries.

## Telecommunication access paths are the basic symptom of the digital divide

### Fixed plus mobile telecommunication access paths per 100 inhabitants




*Source:* OECD and International Telecommunication Union.

- At international level, the most basic, and the most important, indicator of the digital divide is the number of access lines per 100 inhabitants. It is the leading indicator for the level of universal service in telecommunications and a fundamental measure of the international digital divide.

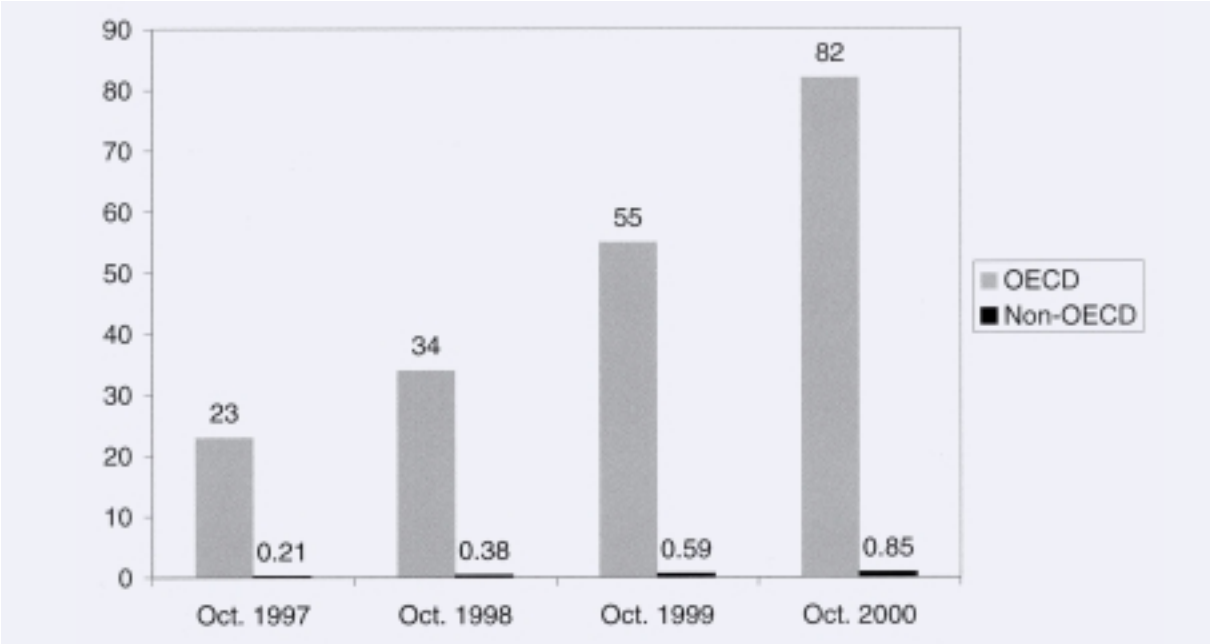
- In 1998, the world's access lines numbered just over 851 million, with some 64.5% in OECD countries. In countries with the lowest GDP per capita, there were only 1.6 lines per 100 inhabitants in 1998.

- The share of OECD countries has steadily fallen over the 1990s, in part because access lines in China have risen from 6.6 million in 1990 to 87.4 million in 1998.

- Over the 1990s, penetration rates have increased in all regions, but in Africa growth has been negligible.

## The digital divide is even more marked for Internet access

### Internet hosts per 1 000 inhabitants




*Source:* Netsizer (www.netsizer.com).

- In October 2000, there were just over 94 million Internet hosts in the world, with 95.6% in the OECD area and 4.4% outside the OECD area. Growth in non-member countries, mostly those with relatively high GDP per capita, has matched growth rates in the OECD area.

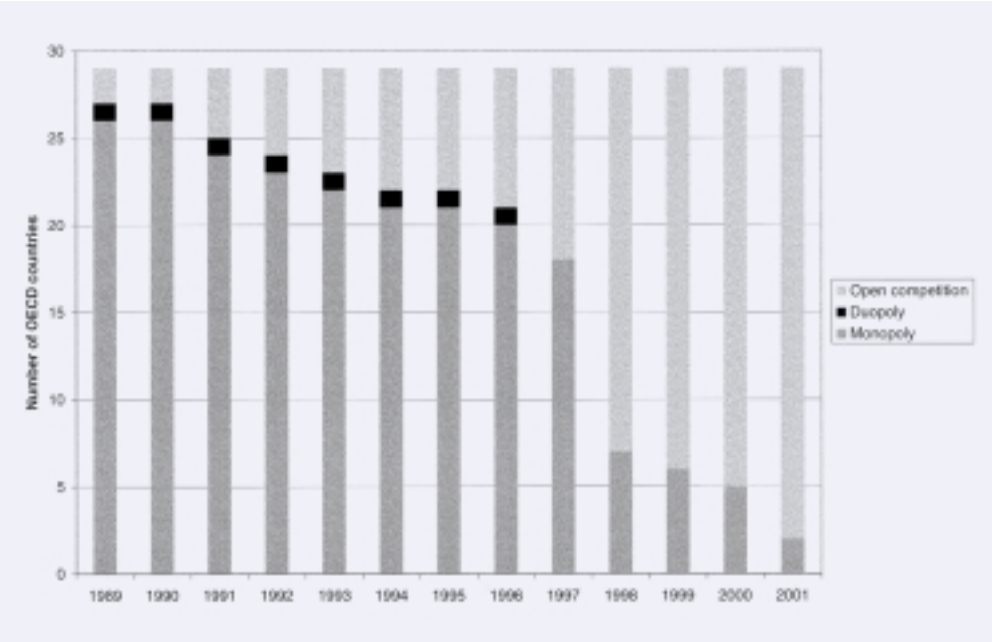
- Chinese Taipei, Singapore, Hong Kong (China) and Israel account for 52% of all Internet hosts outside the OECD area and Argentina, Brazil, Malaysia and South Africa for a further 24%.

- On a regional basis, North America and Europe account for 89% of all Internet hosts. The regional share of Internet hosts is very low in Central and South America and in Africa.

- Africa has only 0.25% of all Internet hosts and its share has been decreasing. The overwhelming majority of these Internet hosts are in South Africa, where the growth rate is slow. The shares of Central and South America have grown, owing to much higher growth rates in Argentina, Brazil and Chile.

## Competition is the road to access

### Liberalisation in public switched telecommunications network (PSTN) markets




*Source:* OECD.

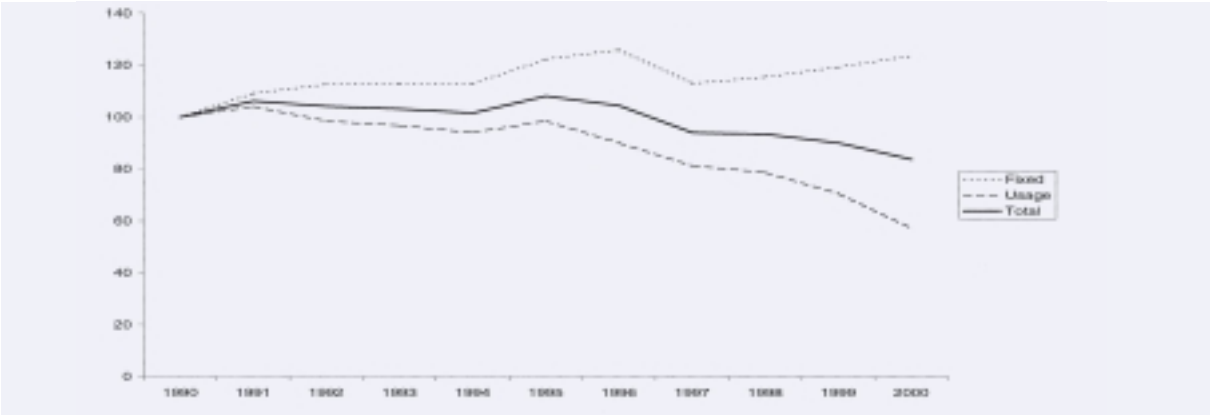
- By 2001, only two countries in the OECD area will still have telecommunications monopolies for the provision of fixed network services.

- Liberalisation of telecommunications services has been crucial to the growth of access lines (fixed and mobile), alternative access technologies, price reductions, Internet access and use.

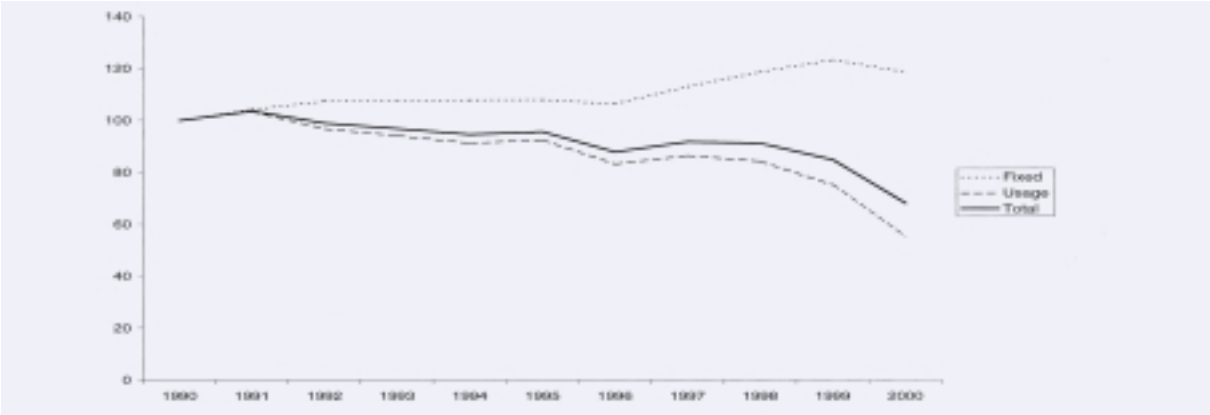
# THE PRICE OF ACCESS

## With liberalisation, access prices are dropping

### Residential telephone charges in the OECD area




### Business telephone charges in the OECD area

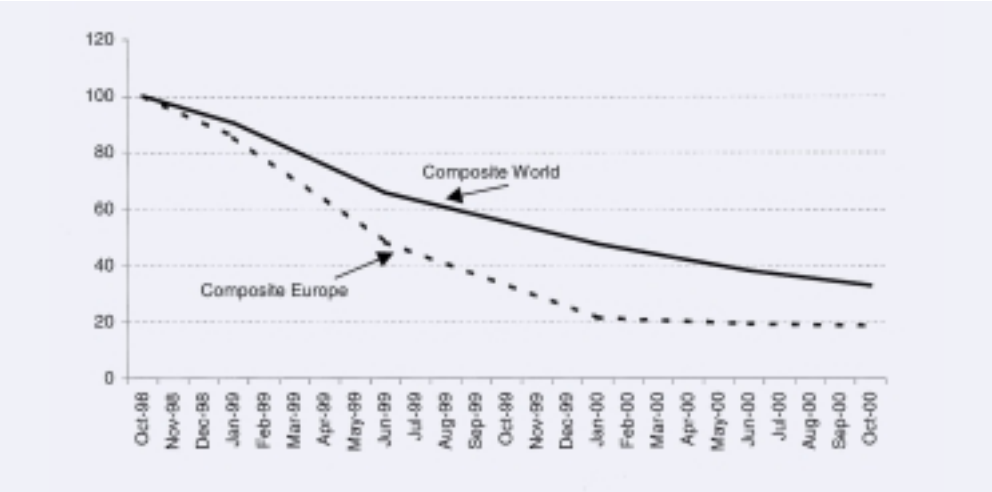



*Source:* OECD.

- Residential and business telephone charges have declined following liberalisation and average prices continue to decline.
- Between 1990 and 2000, and essentially since the middle of the decade when the decrease in usage charges began to outpace the rise in fixed charges, the average price for a basket of residential services has declined by 16%.
- The average price for a basket of services for business users has dropped by 32%, and for the most part since liberalisation (in the EU and EFTA countries, liberalisation took place as of 1998).
- The balance of charges is changing. In 1997, line rentals and local calls for business represented 57.4% of the total rental and usage charges. By 2000, they were 74.3%.

## Liberalisation is also leading to lower bandwidth prices

### October 1998 = 100

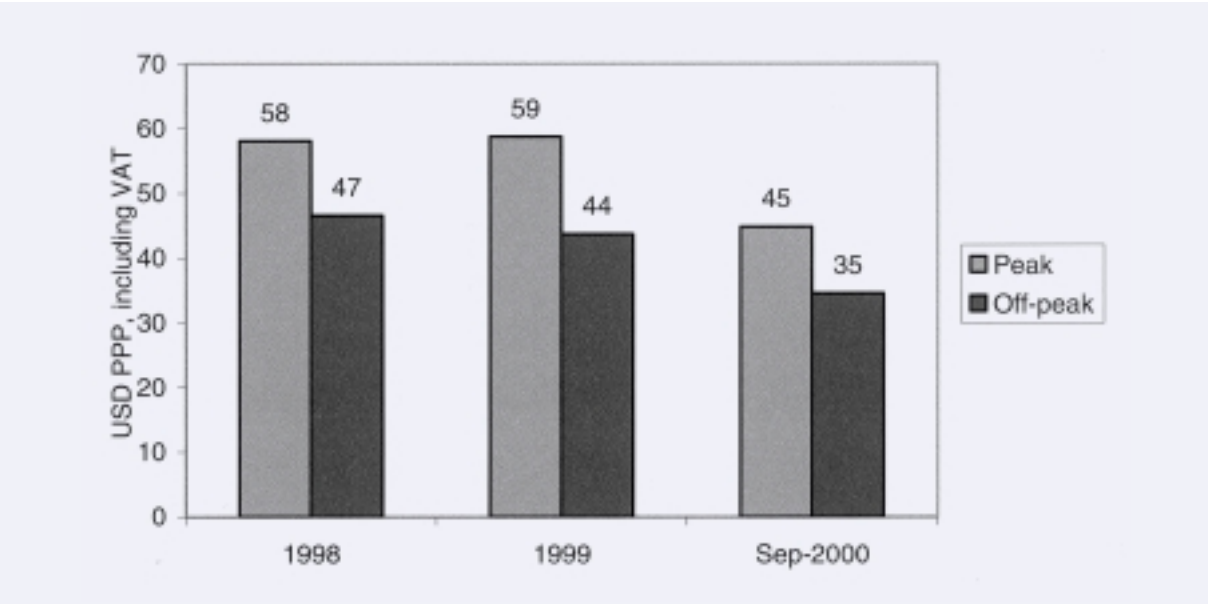



*Source:* Band-X.

- In Europe, the onset of liberalisation in telecommunications markets at the end of 1998 has led to competition and a rapid drop in bandwidth prices.
- Bandwidth prices between London and major European cities have been the source of most of the reduction.
- Capacity trading among operators has also been a factor in the decline in prices.

## At the same time, Internet access prices are declining

### Internet access basket for 20 hours using discounted PSTN rates




*Source:* OECD.

- For consumers and small businesses, the most significant costs for engaging in electronic commerce are the prices of local communication access.

- The average cost to users to access the Internet for 20 hours per month at peak times fell by 24% between October 1999 and September 2000, and by 21% at off-peak times.

- For 40 hours of peak usage per month, including telecommunication charges, the average price of Internet access fell by 27% at peak times and 26% at off-peak times. The greater gains for 40 hours are due to the introduction of unmetered access options in several countries.

- Since 1995, Internet access prices have dropped by more than half, owing in large part to a slow trend towards special dial-up prices for Internet access, which makes it possible to have “always-on” access to the Internet. By September 2000, the incumbent telecommunications carrier offered unmetered Internet access at peak or off-peak times in ten OECD countries, double the number at the beginning of the year.

## Numbers of Internet hosts are rising rapidly worldwide

### Internet hosts per 1 000 inhabitants

| | Oct. 1997 | Oct. 1998 | Oct. 1999 | Oct. 2000 |
|---|---|---|---|---|
| North America | 46.28 | 69.74 | 116.41 | 168.68 |
| Oceania | 26.81 | 34.76 | 43.84 | 59.16 |
| Europe | 6.13 | 9.45 | 13.41 | 20.22 |
| Central and South America | 0.48 | 0.91 | 1.67 | 2.53 |
| Asia | 0.53 | 0.87 | 1.28 | 1.96 |
| Africa | 0.17 | 0.21 | 0.28 | 0.31 |

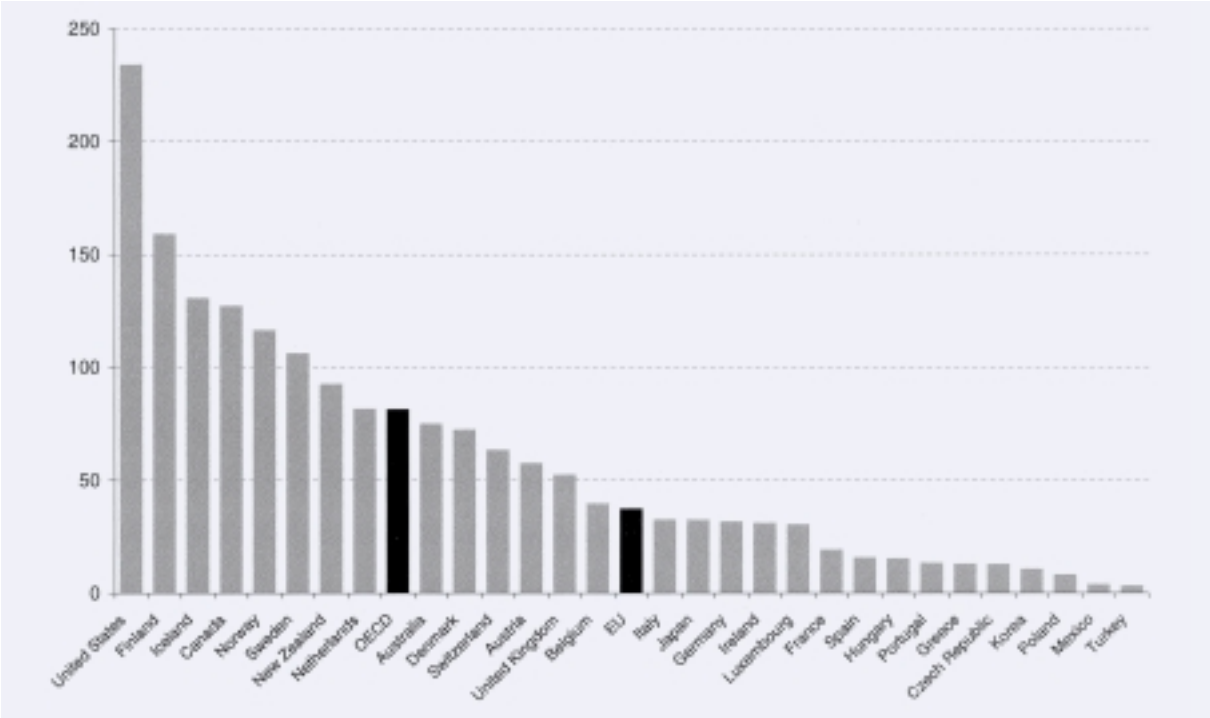
*Source:* Netsizer (www.netsizer.com).

- One good indicator of the international digital divide in relation to the Internet is the penetration rate of Internet hosts. In October 2000, there were 81.5 Internet hosts for every 1 000 inhabitants in OECD countries but only 0.85 per 1 000 inhabitants outside the OECD area. In 2001, the OECD area is expected to surpass 100 Internet hosts per 1 000 inhabitants; non-OECD countries are expected to achieve just one Internet host per 1 000 inhabitants.

- As measured by Internet hosts, the international digital divide is growing rapidly. In October 1997, the digital divide in Internet host penetration between Africa and North America was a multiple of 267. By October 2000, this had grown to a multiple of 540.

## Differences among OECD countries remain large

### Internet hosts in OECD countries per 1 000 inhabitants (July 2000) (gTLD adjusted)




*Source:* Netsizer (www.netsizer.com).

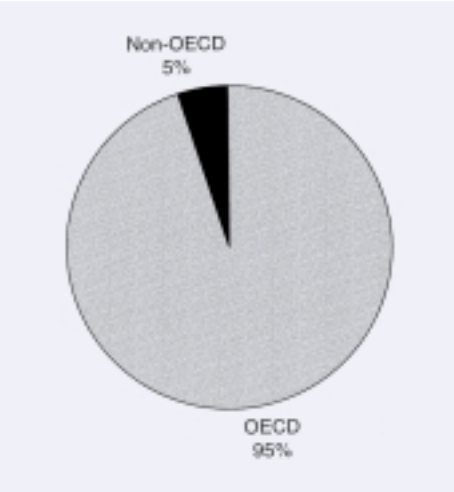
- Hosts per 1 000 population is another good indicator of the relative development of Internet infrastructure in various countries. There are currently large gaps among OECD countries.

- The United States leads by far, with more than 250 hosts per 1 000 inhabitants in July 2000. At that time, the OECD average was 88 hosts per 1 000 inhabitants. The European Union average was 42 per 1 000.

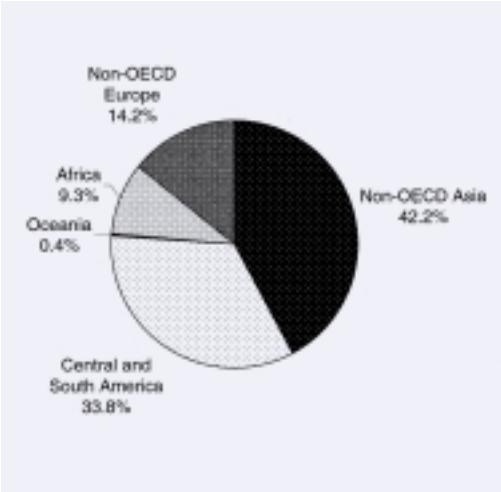
- Comparable figures for July 1998 were 179 per 1 000 inhabitants in the United States and an OECD average of 62 per 1 000. This suggests that countries with high penetration in 1998 are still growing strongly.

## Secure servers are essential for e-commerce and trust

### Secure servers, OECD and non-members (October 2000)




### Share of secure servers in non-members (October 2000)




*Source:* Netcraft (http://www.netcraft.com).

- A key indicator for the development of electronic commerce is the number of secure servers in each country. In October 2000, there were more than 110 000 secure servers worldwide, with some 95% located in the OECD area.

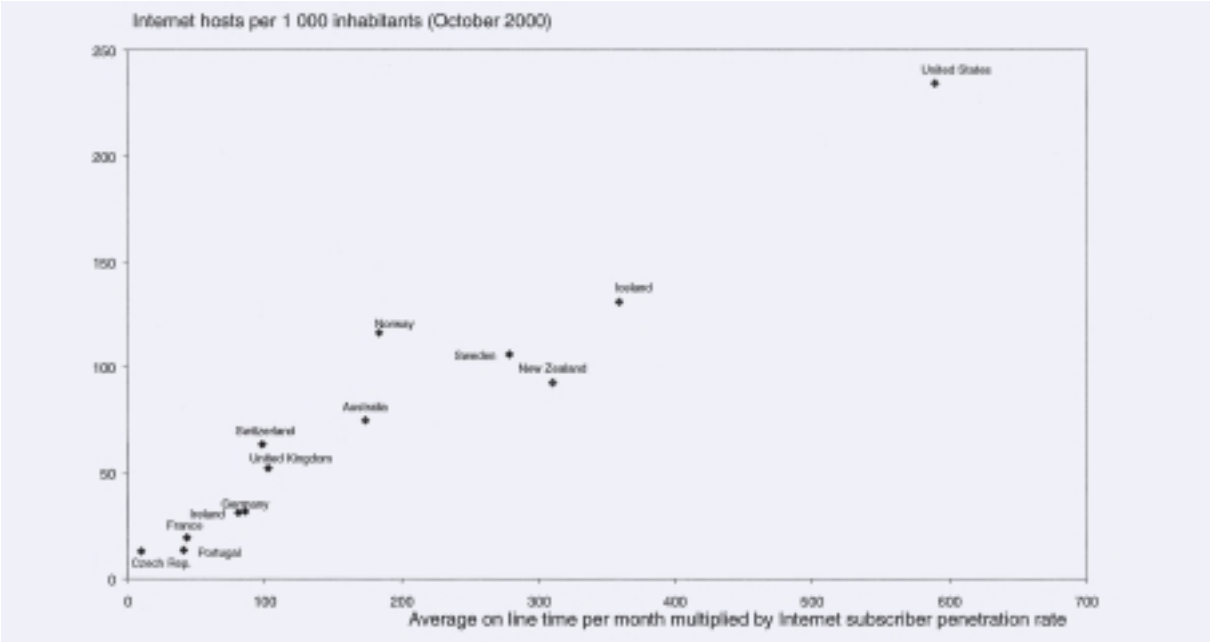
- Lack of access makes it difficult, if not impossible, for people in much of the world to participate in electronic commerce. However, if suitable infrastructure is available, firms located outside the OECD area can access and supply OECD markets.

- Whereas the top 15 non-member countries have 92% of all Internet hosts outside the OECD area, they account for only 77% of secure servers in the non-OECD area.

- Web sites are also important for electronic commerce not only because they give access to Internet content and services but also because they are a way of creating services and content that can be accessed by others. By July 2000, there were 19.8 million Web sites worldwide, of which some 97% were hosted in OECD countries and just 3% outside the OECD area.

- Russia and China, the two non-member countries with the largest number of Web sites, accounted for only 0.31% and 0.30% of all Web sites, respectively.

## Countries with unlimited Internet access stay on line longer




*Source:* OECD and Netsizer (www.netsizer.com).

- While most attention is devoted to how many Internet subscribers there are in a particular country, the level of usage is just as important in determining the "accessibility" of the Internet. Often, however, major telecommunications companies, which are often the largest Internet service providers by market share, report number of subscribers rather than level of usage. Usage is particularly important for the growth of electronic commerce because users with unlimited access have more time to browse, to attend auctions and to interact.

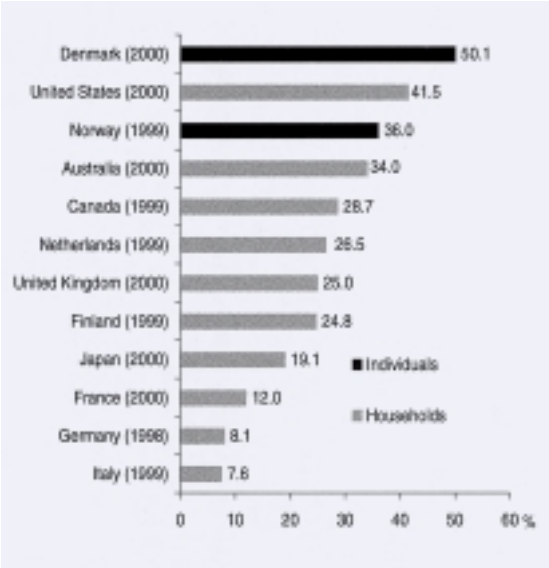
- In countries where metered telecommunications charges apply (left-hand part of the graph), usage generally falls within a band of 5 to 9 hours per month. It is higher in the Nordic countries, which have relatively low metered rates.

- Average usage is much higher in countries with unmetered access to the Internet, such as New Zealand and the United States. In the United States, the average AOL user stayed on line for 32 hours a month at mid-2000. Telecom New Zealand reported average monthly use in excess of 20 hours per subscriber. In both cases, usage began to increase following introduction of unmetered access. Initial indications from countries that introduced unmetered access in 2000, such as the United Kingdom, are that online usage is beginning to increase.

## OECD countries differ markedly in access by individuals and households

### PC penetration in OECD households

### Internet access in OECD households

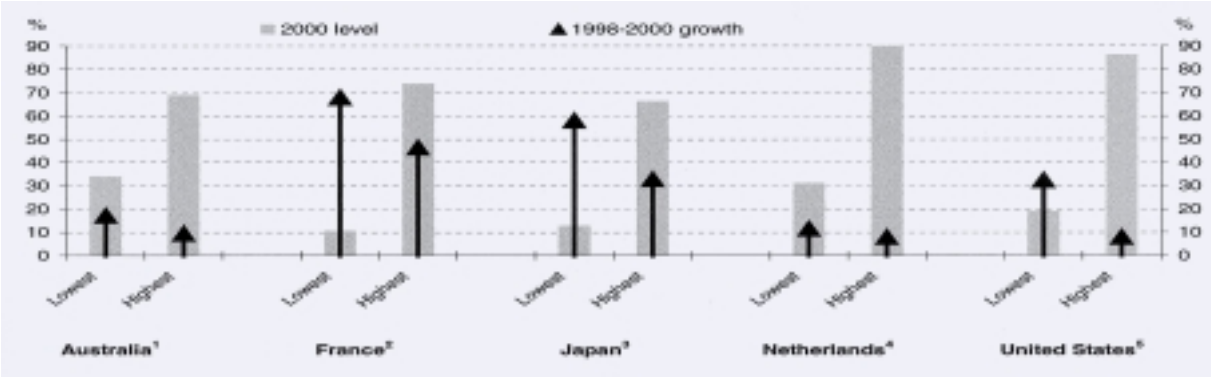



*Source:* OECD, based on national statistical sources.

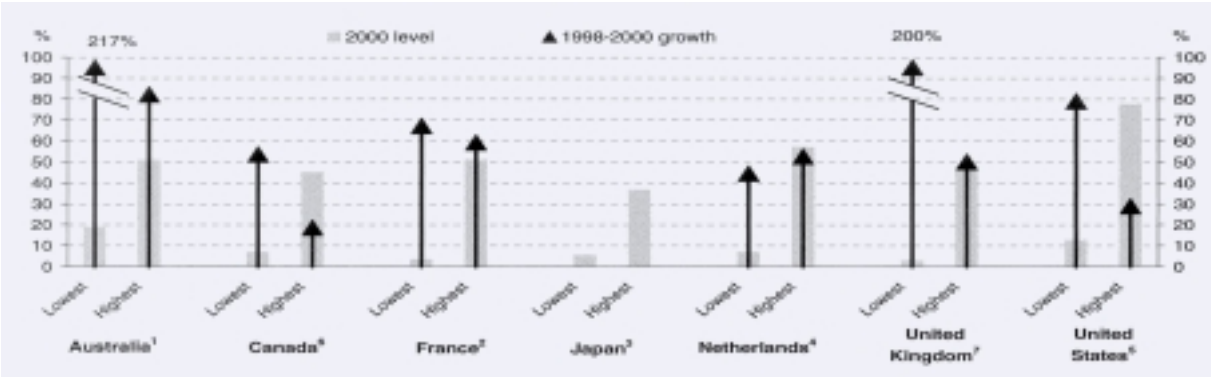
- For both households and businesses, one way of measuring the digital divide is in terms of access to a computer and to the Internet.
- In selected OECD countries, access to PCs varies between 65% and 21% and access to the Internet varies between 50% and about 8%.
- PC diffusion in households is increasing throughout the OECD area. Rates are highest in the Netherlands, Australia and the United States.
- Internet access has generally increased faster than diffusion of PCs because the necessary investments in PC equipment and personal skills have already been made.

## Income is an important determinant of PC penetration and Internet access

### PC penetration by household income, selected OECD countries




### Internet access by household income, selected OECD countries




1. Lowest income bracket: less than AUD 50 000; highest income bracket: more than AUD 50 000.
2. Lowest: less than FRF 80 000; highest: more than FRF 450 000. 1999-2000 growth for Internet.
3. Lowest: less than JPY 3 million; highest: more than JPY 12 million. For Internet, 2000 only, no growth available.
4. Lowest: second decile; highest: tenth decile. 1999 level. 1998-99 growth.
5. Lowest: less than USD 15 000; highest: more than USD 75 000.
6. Lowest: first quartile of income; highest: fourth income quartile. 1999 level of percentage of households using a computer regularly from home. 1998-99 growth.
7. Lowest: second decile; highest: tenth decile. 1998-99 and 1999-2000 instead of 1998 and 2000.

*Source:* OECD and International Telecommunication Union.

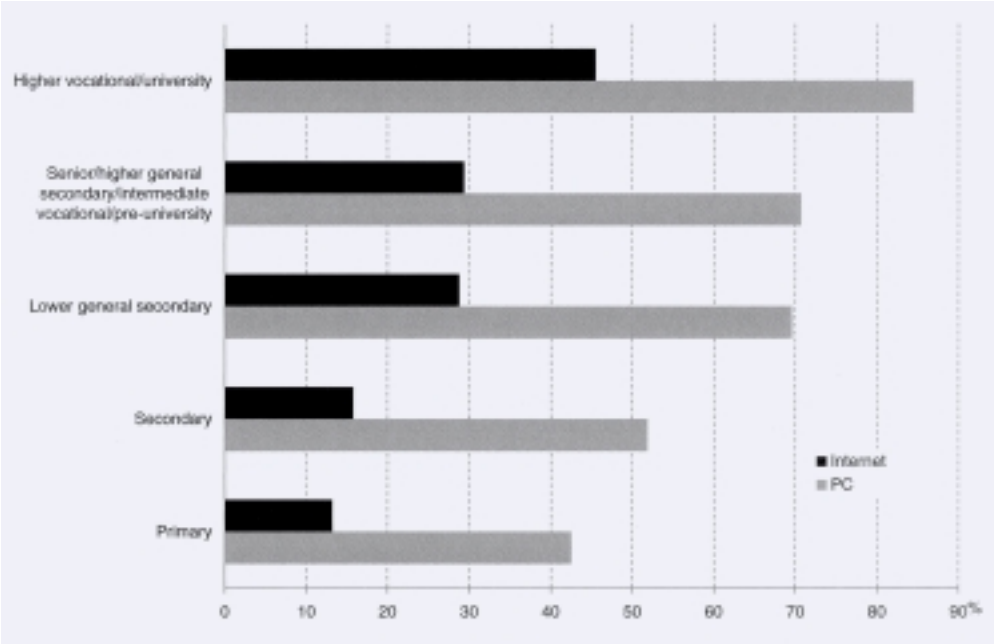
- Household or individual income is an important determinant of the presence of PCs and the extent of Internet access in homes. Income distribution is particularly important early in the diffusion of new technology, with higher income groups acquiring ICTs early and leading uptake.

- The annual percentage point change in penetration has been higher for the highest income groups and penetration is now very high in these groups.

- Rates of increase in access are larger for lowest income groups in almost all countries. In France, for example, the highest income bracket had 74% PC penetration in 2000 and the lowest income bracket only 11%. The growth rate from 1998 to 2000 was 68% for the lowest income bracket, compared with 47% for the highest income bracket.

## Educational attainment helps to explain differences in access to ICTs

### PC and Internet access by educational level in the Netherlands, 1999 (Percentages)

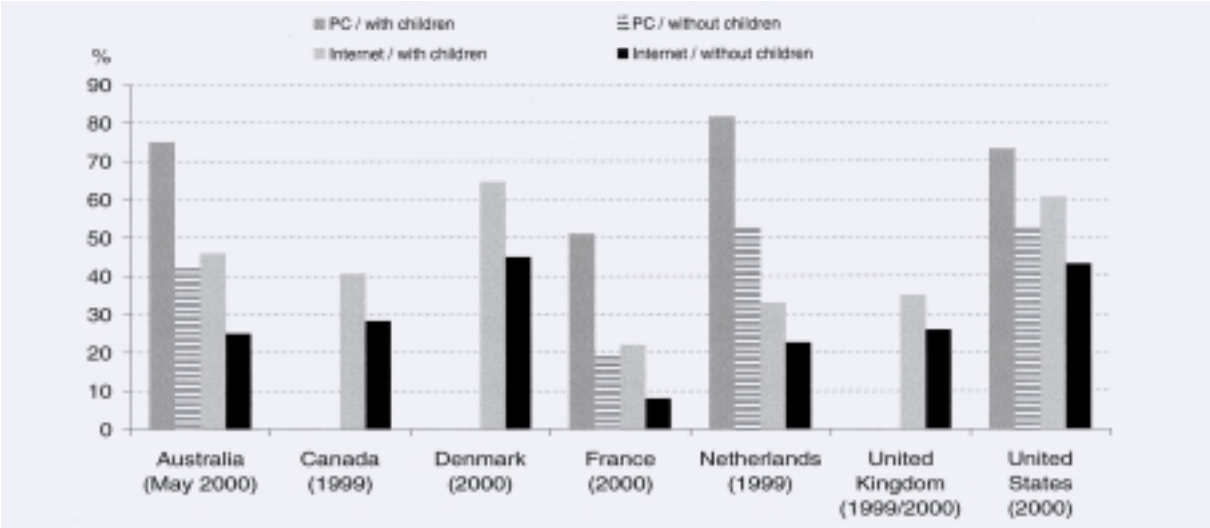



*Source:* OECD, based on national statistical source.

- In general, the higher the level of education, the more likely individuals are to have access to and use ICTs in both the home and the work place. Educational attainment and income are strongly related and explain much of the difference in uptake. Moreover, at the same income level, those with higher educational attainment will have higher rates of access.

- There are large differences in PC penetration and Internet access between those with tertiary education and those at the lowest education levels, although the latter group is growing more rapidly from a low base.

## Family structure makes a difference as well




*Note*: In France, data for households with children refer to those with two children. In the United Kingdom, data refer to households with two or more children.
*Source*: OECD, based on national statistical sources.

- Size and type of household are an important factor in PC penetration and Internet access. Families with children have the highest access of all households, and couples with children under 18 are more likely to have a PC and Internet access. Rates for these types of households are approximately double the rate for single person households.

## Age and gender play their role

- PC penetration and Internet access are generally lower for older people than for younger people. Usage has tended to grow faster in younger age groups.

- The highest users appear to be the 35-45 year age group. Age patterns are similar across countries.

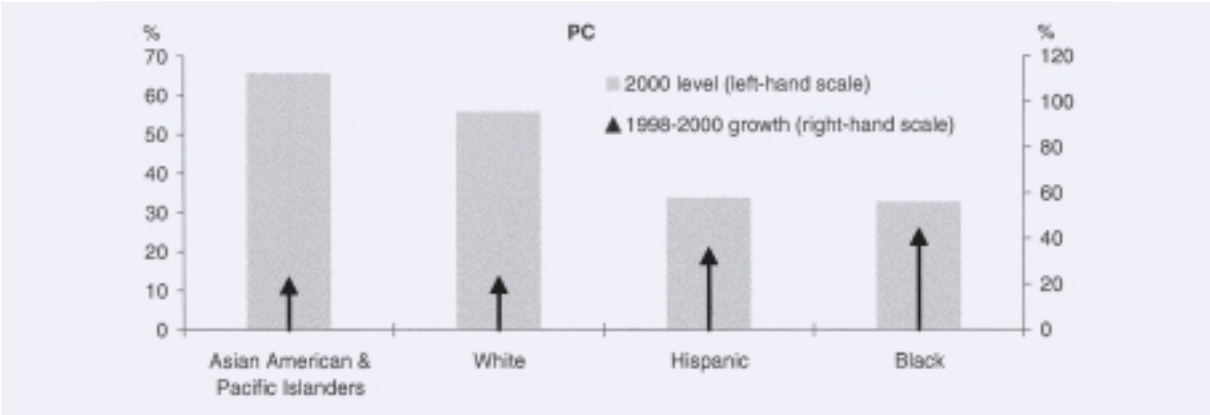
- There are peaks in lower age groups in France and the Netherlands, but only in Australia and the United Kingdom do surveys (in 2000) show the youngest surveyed age groups with the highest rates of Internet access.

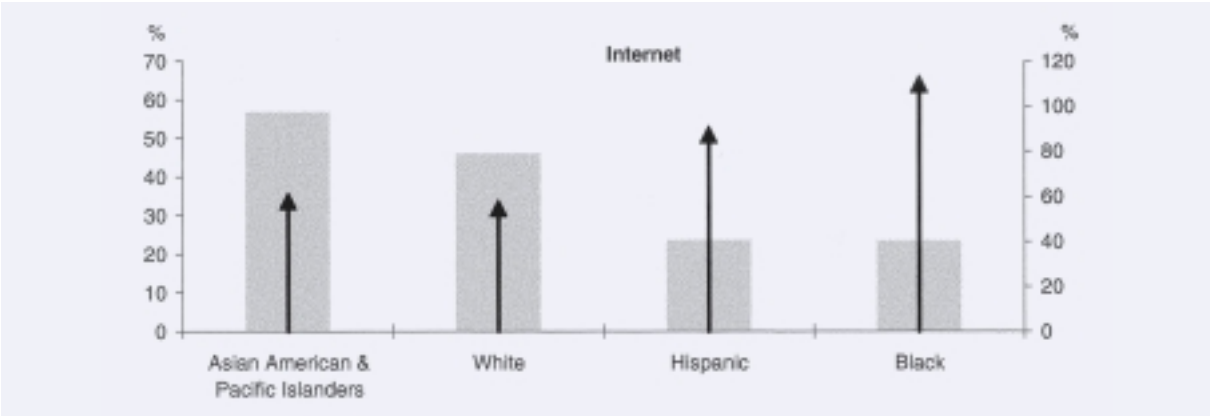
- Differences in the use of the new technologies based on gender appear rather small. In the United States (August 2000), Internet use rates by men and women were statistically identical. However, women users tended to be in the younger age groups, while men were in the older age groups. For Iceland, which has high rates of ICT access, the picture is similar.

- In Sweden, recent data suggest that men may be outpacing women in use of the Internet. In Japan, men access the Internet from home at about twice the rate of women, although women are catching up. In the United Kingdom, 52% of men accessed the Internet in July 2000 but only 39% of women.

## An ethnic divide is also apparent

### PC and Internet penetration by ethnic group in the United States



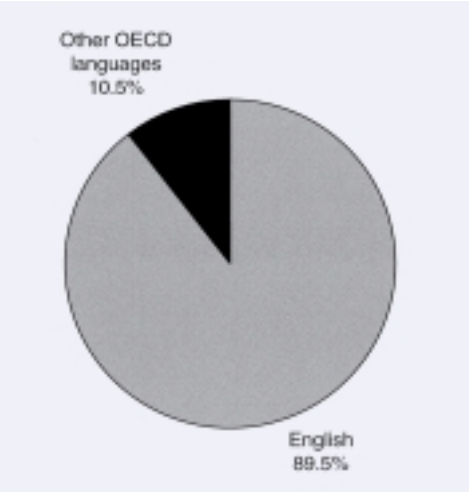

*Source:* OECD, drawn from US Department of Commerce.

- There appear to be significant differences in access across groups from different racial, ethnic and cultural backgrounds, although these differences may be largely related to income and education. Some ethnic groups have achieved relatively greater access to and use of ICTs.

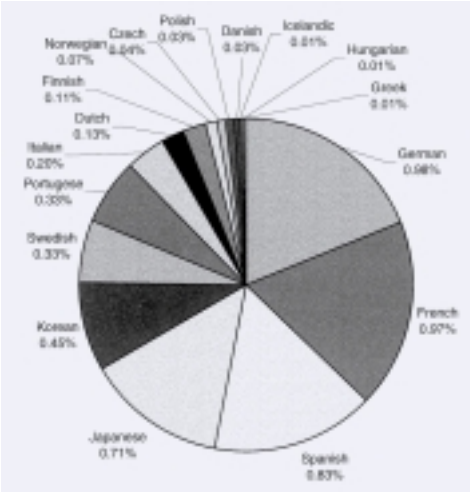
- Data from the United States show a very large difference in PC and Internet penetration by different ethnic groups. Asian Americans have the highest penetration rates, a little ahead of white citizens. Hispanic and African American citizens have considerably lower access.

## English is the main language of the Internet

### Links to secure servers by language (July 2000) (All languages)




### Links to secure servers by language (July 2000) (Excluding English: 89.5%)



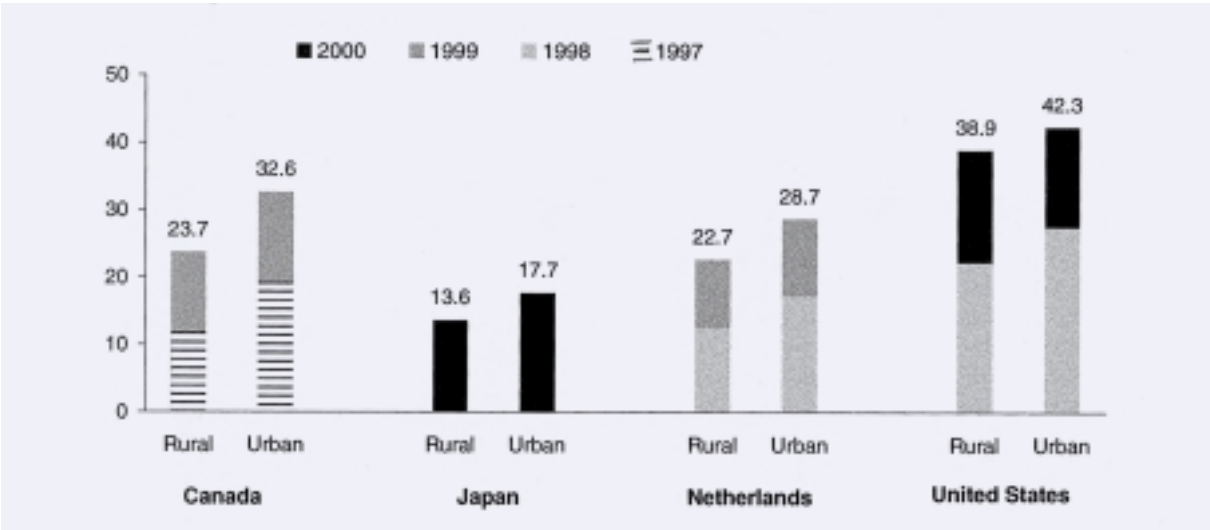

*Source:* OECD.

- English is, overwhelmingly, the language of e-commerce. In July 2000, more than 94% of links to pages on secure servers (almost 2.9 million links) were in English.

- The only other languages to account for more than 1% of detected links to secure servers were German (31 785 links) and French (30 954 links), although Spanish (26 512 links) and Japanese (22 852 links) came close.

## Urban homes are more connected than rural ones

### Internet access among rural and urban households

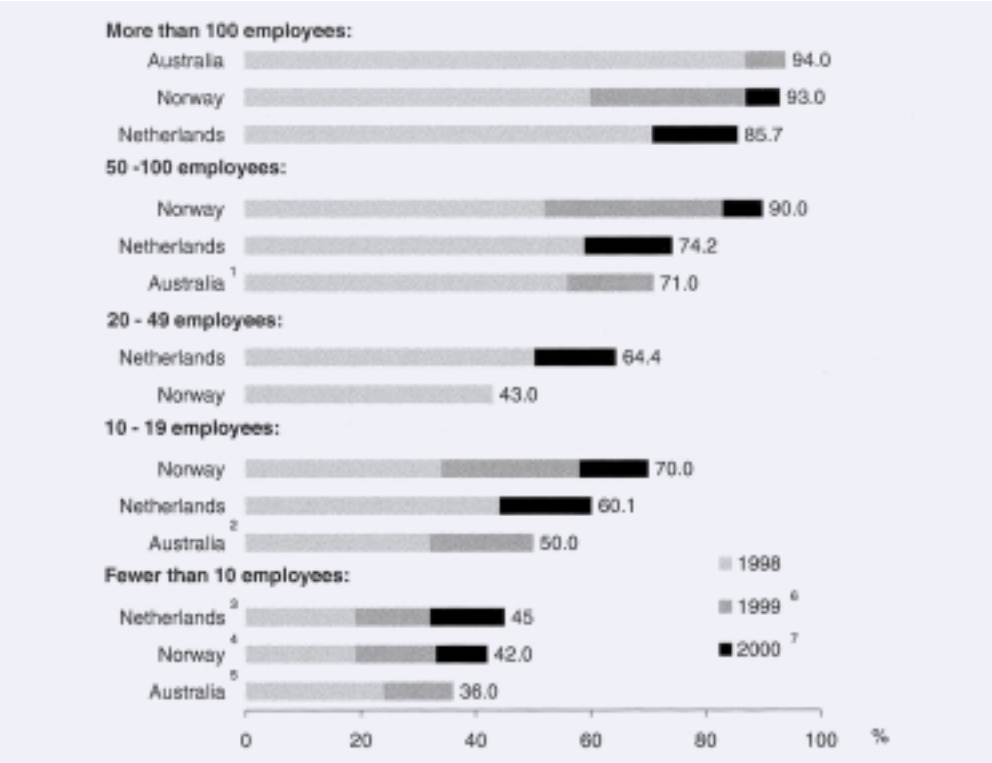



*Note:* For the Netherlands, "rural" is defined by a low degree of urbanisation, and "urban" by a high degree of urbanisation. For Japan, "rural" is defined as "villages and towns" and "urban" as "cities". For both countries, the highest categories of urbanisation were not taken into account.
*Source:* OECD, based on national statistical sources.

- Internet access in urban areas is everywhere greater than in rural areas.
- Members of households in urban areas are more likely to have occupations where computers and the Internet are part of their work environment.
- Costs tend to be higher and quality of access lower in rural areas, despite some efforts to ensure standardised pricing and quality.
- Incomes tend to be lower in rural areas and ICT costs are relatively higher for low-income groups.

## Firm size is important for Internet access

### Internet access in the business sector by firm size




1. Firms with 20-99 employees.
2. Firms with 5-19 employees.
3. Firms with 5-9 employees.
4. Firms with 1-9 employees.
5. Firms with 1-4 employees.
6. Forecasts made in 1998.
7. Forecasts made in 1999.

*Source:* OECD, based on national statistical sources.

- In business, ICT penetration and Internet access are a function of firm size. Smaller business units are less likely to have invested in new technologies and to use the Internet.

- Differences by size classes have tended to diminish over time, mainly due to the close to complete rates of access for large business units. However, rates in larger units are still twice those of the smallest units.

- Larger units are more likely to undertake more complex and more advanced transactions and business processes than smaller ones.

- Differences by size class are important so that, other things being equal, economies with large shares of small and very small businesses tend to have lower rates of uptake.

## Business and industry sectors differ in their use of the Internet

### Internet access and use in leading and lagging sectors

| Country | Period | Leading sectors | Lagging sectors |
|---|---|---|---|
| Australia | 1998 | Mining, property and business services, communications, wholesale, finance | Transport and storage, retail, accommodation and restaurants |
| Canada | 1999 | Public sector (education, public administration, health), information, utilities, professional services, finance and insurance | Transport, retail, forestry, accommodation and food |
| Denmark | 1997-99 (annual) | Business services, manufacturing | Building, construction |
| France | 1995-99 (annual) | Services, manufacturing | Transport, building and public works |
| Japan | 1998-00 (annual) | Manufacturing, finance and insurance | Wholesale and retail, transport and communications |
| Netherlands | 1995-00 (annual) | Utilities, business services, manufacturing | Agriculture, mining, construction |
| Norway | 1998, 2000 | Financial, wholesale, other services | Hotels and restaurants, retail |

*Source:* OECD, based on national statistical sources and UFB Locabail (for France).

- Firms differ considerably in their use of information technology and the Internet, depending on the industry.
- Information-intensive services (business and property services, communications, finance and insurance) and the public sector (education, public administration, health care) usually have the highest penetration rates.
- Transport and storage, retail trade and accommodation and food services generally have the lowest penetration rates, with manufacturing approximately in the middle. Differences by industry are also related to size.

## Urban regions have better access than rural ones

### ICT equipment and Internet access in leading and lagging regions

| Country | Period | Leading sectors | Lagging sectors |
|---|---|---|---|
| Canada | 2000 | British Columbia, Ontario | Quebec, Saskatchewan, Newfoundland |
| France | 1999 | Paris region [for SME access] | South-east, West |
| | | Paris region [Web] | Centre |
| Italy | 2000 | North-east | South |
| Norway | 1999 | Oslo, counties with developed regional centres | Peripheral counties without developed centres |

*Source:* OECD, based on national statistical sources.

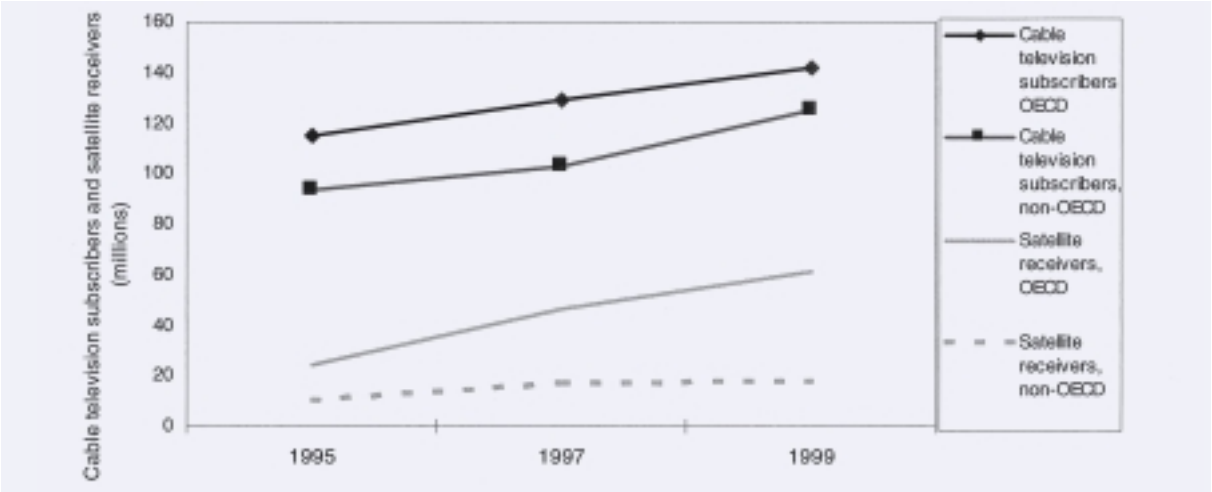
- Internet access levels are higher in capital cities and highly industrialised and advanced regions than in rural and peripheral regions.

- Leading areas tend to have higher concentrations of more technologically advanced businesses and academic and research institutions which are likely to have high levels of uptake and use of new technologies. Firm size tends to be smaller in more remote areas, accentuating divides. Agglomeration effects, positive externalities and clustering of advanced firms reinforce divides.

- Network infrastructure tends to be more expensive and of lower capacity and quality in remote areas.

## Cable and satellite access may increase demand for the Internet

### Growth of cable and satellite dish (DBS) penetration in OECD households (1995-99)




*Source:* OECD and International Telecommunication Union.

- Cable TV and satellite transmission are widespread and growing in OECD countries and may also become an effective means of Internet access.

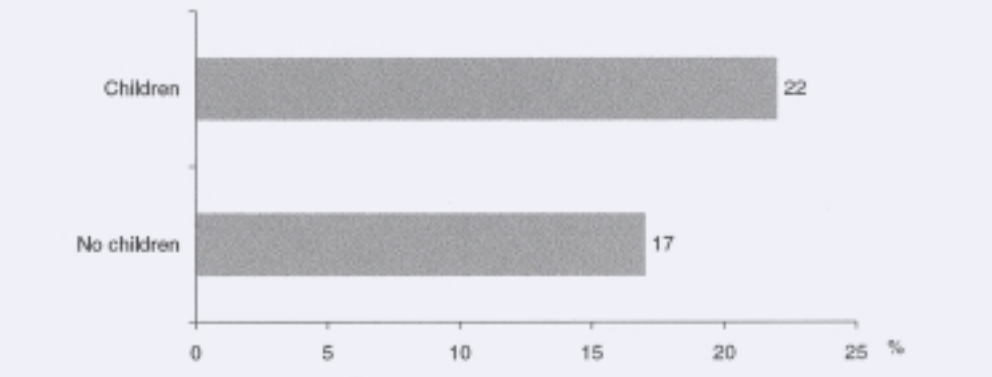
- About 40% of all OECD households are connected to cable. In a number of geographically small European countries (Belgium, Luxembourg, the Netherlands, Switzerland), the penetration rate of cable networks exceeds 90%. In Canada, Denmark, Germany, Sweden and the United States, more than half of households receive their television service by cable. Given the relatively wide coverage, growth in numbers of subscribers has been modest overall, although in countries with a low penetration rate, growth has been much higher.

- Subscribers to satellite packages in OECD countries are about a quarter of the number of cable subscribers, but the growth rate is much higher. Satellite subscribers more than doubled from 1997 to 1999 in a number of countries in which most households subscribed to a digital package. Japan is the largest satellite market (in terms of number of subscribers), although the rate of growth over the last three years has been relatively low and the conversion to digital has been much slower.

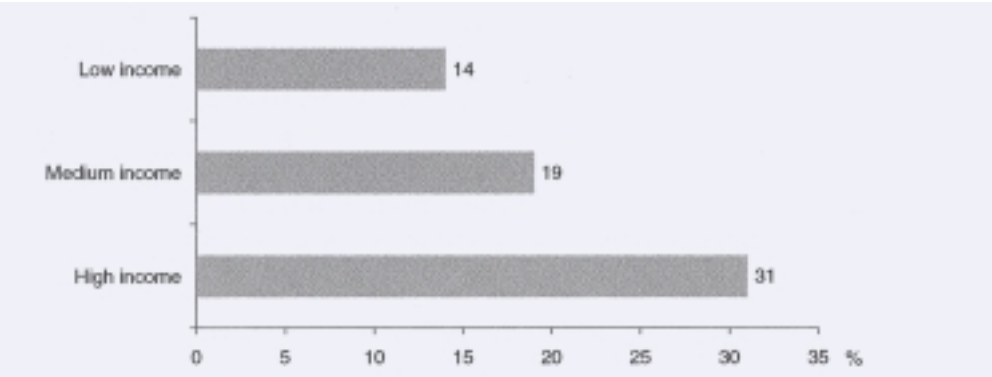
- The introduction of digital terrestrial television (DTTV) has opened up the possibility of offers of multiple channel packages which can be received over the air waves. Operators in Spain and the United Kingdom are also offering Internet access to their subscribers.

## Digital TV may be a means of diminishing the digital divide

### UK penetration of digital TV by households with children




### UK penetration of digital TV by income




*Source:* Oftel. High income: more than GBP 30 000; medium: GBP 17 500-30 000; low: less than GBP 17 500.

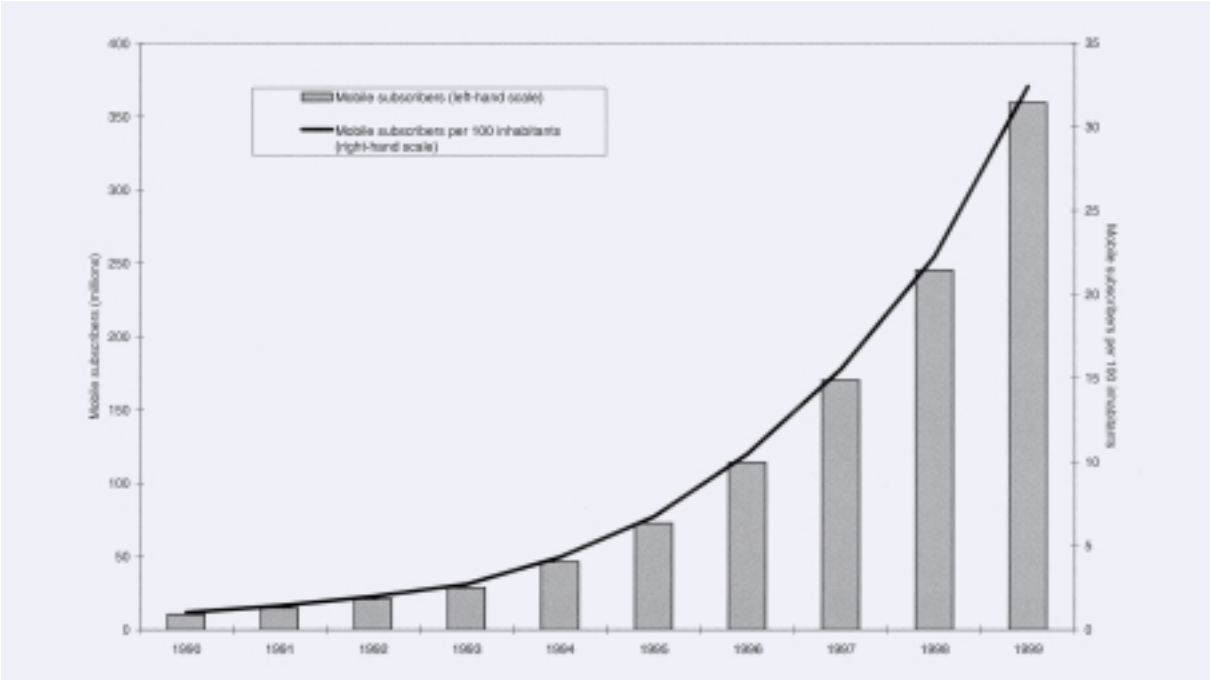
- TVs, because of their high levels of diffusion, low cost, and ease and familiarity of use may provide an alternative (non-PC) route to the Internet.

- Because the television is a familiar and relatively cheap household appliance, interactive television services could potentially bring the Internet to poor, less well-educated, elderly and other low-access groups and thus help to bridge the digital divide. However, this is likely to be slow and patterns of household TV Internet use are likely to be different from PC Internet use.

- In 1998, there were 1.46 billion TVs worldwide and 637 million in OECD countries (ITU, 2000). As of mid-2000, about 56 million households worldwide subscribed to digital television services (4% of total), but of Europe's 12.2 million digital TV subscribers, less than half were offered e-mail capabilities and less than 10% Web services.

## Mobile telephony offers another potential route for access

### Mobile subscribers in the OECD area




*Source:* OECD.

- Mobile telephony is inexpensive and accessible. Hand-held devices and third-generation mobile telephony are being developed to expand Internet access.

- In OECD countries, use of mobile networks grew at 49% a year over 1995-99, while the rate for established fixed networks was 4%. Moreover, in an increasing number of OECD countries digital services provide opportunities for more advanced Internet-based services.

- However, mobile Internet access is still relatively expensive due to slow access and time-based pricing models of service providers. If prices were to fall considerably, particularly relative to fixed access prices, this would boost Internet access.

# POLICIES TO REDUCE THE DIGITAL DIVIDE

## OECD governments are implementing policy measures to improve ICT access and use

### Network infrastructure

- Infrastructure development
- Regulatory initiatives to enhance network competition

### Diffusion to individuals and households

- Access in schools
- Access in other public institutions

### Education and training

- Training in schools
- Vocational training

### Diffusion to businesses

- ICT support and training for small businesses
- Assistance to regions and rural areas

### Government projects

- Government services on line
- Governments as model users of ICT

### Multilateral co-operation

*Source:* OECD, based on analysis of responses to a policy questionnaire.

# FURTHER READING

The OECD Privacy Policy Statement Generator is available at:
http://cs3-hq.oecd.org/scripts/pwv3/pwhome.htm


OECD (1980), *Guidelines on the Protection of Privacy and Transborder Flows of Personal Data*, Paris.

OECD (1992), *Guidelines for the Security of Information Systems*, Paris.

OECD (1998), *Cryptography Policy: The Guidelines and the Issues*, Paris.

OECD (1999), *OECD Communications Outlook 1999*, Paris.

OECD (1999), *The Economic and Social Impact of Electronic Commerce: Preliminary Findings and Research Agenda*, Paris.

OECD (2000), *Guidelines for Consumer Protection in the Context of Electronic Commerce*, Paris.

OECD (2000), *Information Technology Outlook 2000*, Paris.

OECD (2000), *Mobile Phones: Pricing Structures and Trends*, Paris.

OECD (2000), *A New Economy? The Changing Role of Innovation and Information Technology in Growth*, Paris.

OECD (forthcoming, 2001), *OECD Communications Outlook 2001*, Paris.



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